

In re Patent Application of
BOUCHE ET AL.
Serial No. Not Yet Assigned
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In the Claims:

Claims 1-15 (Cancelled).

16. (New) A method for attaching a first element to a second element, the first element having a surface portion covered with a layer of silicon and the second element having a surface portion covered with a layer of nickel, the method comprising:

applying pressure so that the surface portions of the first and second elements are in contact with one another, with a roughness between the surface portions being less than about 1 μm ; and

heating the first and second elements at a temperature greater than 250°C.

17. (New) A method according to Claim 16, wherein the first and second elements form part of a microsystem.

18. (New) A method according to Claim 16, wherein the first and second elements are heated at a temperature less than to 400°C.

19. (New) A method according to Claim 16, wherein the first and second elements are heated for at least 5 minutes.

20. (New) A method according to Claim 16, wherein the first and second elements are heated for at least 20 minutes.

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21. (New) A method according to Claim 16, wherein the heating results in a bonding layer being formed at an interface between the first and second elements, the bonding layer comprising silicon and nickel and having a thickness of about 1 μm .

22. (New) A method according to Claim 16, wherein the second element further comprises a layer of silicon adjacent the layer of nickel.

23. (New) A method according to Claim 16, wherein the first element further comprises a layer of nickel adjacent the layer of silicon.

24. (New) A method according to Claim 16, wherein the first element is configured as an encapsulating cover; and wherein the second element comprises a resonator supported by a Bragg mirror that includes the layer of nickel between upper and lower material layers; the method further comprising the following before the first and second elements are placed in contact with one another:

removing a portion of the upper material layer surrounding the resonator for exposing the layer of nickel; and

positioning the encapsulating cover over the resonator so that after applying the pressure and heating, the resonator is sealed.

25. (New) A method according to Claim 24, wherein

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the resonator is hermetically sealed.

26. (New) A method for encapsulating a component on an integrated circuit, the integrated circuit having an exposed surface portion covered with a layer of nickel adjacent the component, the method comprising:

providing an encapsulating cover having a surface portion covered with a layer of silicon;

applying pressure so that the layer of silicon of the encapsulating cover is in contact with the layer of nickel of the integrated circuit, with a roughness between the surface portions being less than about 1 μm ; and

heating the encapsulating cover and the integrated circuit at a temperature greater than 250°C.

27. (New) A method according to Claim 26, wherein the component is hermetically sealed.

28. (New) A method according to Claim 26, wherein the component comprises a resonator, and the integrated circuit comprises a Bragg mirror supporting the resonator with the layer of nickel forming a portion of the Bragg mirror.

29. (New) A method according to Claim 26, wherein the component and the integrated circuit form part of a microsystem.

30. (New) A method according to Claim 26, wherein the encapsulating cover and the integrated circuit at a temperature less than 400°C.

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31. (New) A method according to Claim 26, wherein the encapsulating cover and the integrated circuit are heated for at least 5 minutes.

32. (New) A method according to Claim 26, wherein the encapsulating cover and the integrated circuit are heated for at least 20 minutes.

33. (New) A method according to Claim 26, wherein the heating results in a bonding layer being formed at an interface between the encapsulating cover and the integrated circuit, the bonding layer comprising silicon and nickel and having a thickness of about 1 μm .

34. (New) A method according to Claim 26, wherein the integrated circuit further comprises a layer of silicon adjacent the layer of nickel.

35. (New) A method according to Claim 26, wherein the encapsulating cover further comprises a layer of nickel adjacent the layer of silicon.

36. (New) A method for encapsulating a component on an integrated circuit, the integrated circuit having an exposed surface portion covered with a layer of conductive material adjacent the component, the method comprising:

 providing an encapsulating cover having a surface portion covered with a layer of silicon;

 forming a layer of nickel on the exposed layer of

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conductive material;

applying pressure so that the layer of silicon of the encapsulating cover is in contact with the layer of nickel of the integrated circuit, with a roughness therebetween being less than about 1 μm ; and

heating the encapsulating cover and the integrated circuit at a temperature greater than 250°C.

37. (New) A method according to Claim 36, wherein the component is hermetically sealed.

38. (New) A method according to Claim 36, wherein the component comprises a resonator, and the integrated circuit comprises a Bragg mirror supporting the resonator with the layer of conductive material forming a portion of the Bragg mirror.

39. (New) A method according to Claim 36, wherein the component and the integrated circuit form part of a microsystem.

40. (New) A method according to Claim 36, wherein the encapsulating cover and the integrated circuit are heated at a temperature less than 400°C.

41. (New) A method according to Claim 36, wherein the encapsulating cover and the integrated circuit are heated for at least 5 minutes.

42. (New) A method according to Claim 36, wherein

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the encapsulating cover and the integrated circuit are heated for at least 20 minutes.

43. (New) A method according to Claim 36, wherein the heating results in a bonding layer being formed at an interface between the encapsulating cover and the integrated circuit, the bonding layer comprising silicon and nickel and having a thickness of about 1 μm .

44. (New) A method according to Claim 36, wherein the conductive material further comprises at least one of copper, aluminum, tungsten and molybdenum.

45. (New) A method according to Claim 36, wherein the encapsulating cover further comprises a layer of nickel adjacent the layer of silicon.

46. (New) An integrated circuit comprising:
a substrate comprising a layer of nickel between a first dielectric layer and a second dielectric layer, said first dielectric layer having an opening therethrough for exposing a portion of said layer of nickel;;
a component on said first dielectric layer and adjacent said exposed layer of nickel;
an encapsulating cover for encapsulating said component and having surface portions covered with a layer of silicon, said layer of silicon being in contact with said exposed layer of nickel; and
an interface between said layer of silicon of said encapsulating cover and said layer of nickel of said

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substrate comprising a bonding layer of silicon and nickel having a thickness of about 1 μm .

47. (New) An integrated circuit according to Claim 46, wherein said encapsulating cover hermetically seals said component.

48. (New) An integrated circuit according to Claim 46, wherein said component comprises a resonator; and wherein said first and second dielectric layers and said layer of nickel form a Bragg mirror supporting said resonator.

49. (New) An integrated circuit according to Claim 46, wherein said substrate, said component and said encapsulating cover form part of a microsystem.

50. (New) An integrated circuit according to Claim 46, wherein said encapsulating cover further comprises a layer of nickel adjacent said layer of silicon.